

Description

The E-T-A Solid State Remote Power Controller E-1072-2.. complies with the EC Machinery Directive 98/37/EG and meets the requirements of EN60204 part 1 "Electrical equipment of machinery, safety of machinery" in ungrounded DC 24 V supply systems ("IT systems").

The E-1072-2.. is a double pole electronic switching amplifier for magnetic valves (hydraulic and pneumatic mechanisms), magnetic brakes and magnetic couplings with rated voltage DC 24 V and a max. current rating of 1 A or 2 A. It combines true circuit breaker characteristics with additional diagnostic functions.

Why use the E-1072-2..

- for double pole switching of actuators (magnetic valves, magnetic brakes) in machinery and equipment
- for monitoring the electronic function of the loads and signal to the PLC
- for preventing a voltage dip of the DC 24 V output voltage in a switch-mode power supply, in the event of a short circuit, as a true 2 pole, remotely controllable electronic circuit breaker
- for protecting the cables of the load circuit
- for status signalling and for visually indicating load circuit faults (LEDs or RED trip button) via potential-free signal contacts
- for double-pole physical isolation of the load circuit – manually or electrically in the event of a failure (short circuit/overload)

Features

- Voltage rating DC 24 V (19.2...36 V)
- Current rating I_N max. 1 A or 2 A (min. load current 30 mA)
- Activates and monitors DC 24 V magnetic valves
- PLC controllable 2 pole remote power controller with physical isolation of control input
 - Switching output with integral current limitation to $2 \times I_N$
 - Disconnection of load in the event of short circuit or overload, followed by double pole physical isolation of load
 - Permanent wire break monitoring of load circuit
 - Group fault signalisation via relay contact "Err1"
 - Additional signal contact "Err2" when integral circuit breaker has tripped due to short circuit or overload in the load circuit
 - LED displays: LED green: OK
LED red: Error
LED yellow In/Ctrl (control current indication)
 - Integral reverse polarity protection and overload protection for control and load circuit
 - No back-up fuse required due to integral fail-safe element
 - Track-mountable, width 22.5 mm

Additional feature E-1072-210

- additional "status indication" relay output to facilitate confirmation to a PLC, for example, of activation and a load current > 30 mA.

Additional feature E-1072-220

- (see fig. "inrush current curve magnetic valves")
- Analogue output 4-20 mA proportional to load current enables permanent monitoring of magnetic valve circuits as well as recording of the load current via ET200 sub-assemblies or field bus modules (with analogue input). In addition it is possible to check the inrush current characteristic curve of a magnetic valve to determine whether the armature of the valve has moved or is stuck.



E-1072-220

Technical Data ($T_U = 25^\circ\text{C}$, $U_S = \text{DC } 24\text{ V}$) ($T_U = \text{ambient temperature at } U_N$)

Voltage rating U_N	DC 24 V
Operating voltage U_S	DC 19.2...36 V
Current rating I_N	max. 1 A or 2 A
Current consumption I_0	typically 25 mA
($U_{\text{Contr}} = "0"$)	
Power loss P_{max} ($I_N = 1\text{ A}$)	typically 1.6 W
Residual ripple for all voltages	max. 5 % (3 phase bridge)
Reverse polarity protection U_S integral -> fault release, LEDs not lighting	
	Caution: Ensure free travel of actuator button.
Insulation voltage	AC 500 V (control circuit, load circuit, fault indication "Err1" and "Err2") indication "BM"
Load Circuit	
Load output (term. 31-term. 32)	two pole switching output (minus and plus switching), MOS transistors
Max. load data	DC 24 V/1 A or 2 A (no derating over the entire temperature range!)
Min. load data	DC 24 V / 50 mA (wire break threshold 30 mA)
Voltage drop at I_N (with $I_N = 1\text{ A}$)	typically 0.8 V
Switching times ($t_{\text{on}}/t_{\text{off}}$)	typically 1 ms (resistive load)
Overload disconnection	approx $1.15 \times I_N$
Trip time ($I_{\text{load}} = 1.5 \times I_N$)	typically 1 s
Short-circuit current I_K	typically $2 \times I_N$ current limitation
Trip time (upon I_K)	typically 300 ms at $I_N = 1\text{ A}$, 100 ms at $I_N = 2\text{ A}$, 2-pole isolation of load circuit after approx. 20 ms -> RED LED indicates, fault indication F "Err1" and "Err2"
Wire break monitoring	with the load switched on or off; RED LED "Error" lighted, group fault signalisation "Err1" ($U_{\text{Contr}} = "0"$) wire break threshold $R_{\text{load}} > 30\text{ k}\Omega$ ($U_{\text{Contr}} = "1"$) minimum current $I_{\text{load}} < 30\text{ mA}$
Supervision of load circuit	with the load switched on, the load current is monitored via the two switching outputs GREEN LED indicates (OK signal), $I_{\text{load}} > 30\text{ mA}$
Leakage current ($U_{\text{Contr}} = "0"$)	typically 1 mA
Free-wheeling circuitry	integral
Load current measurement (term. 33: +shunt/ term. 34: -shunt)	no isolation of load circuit required as a $I_N = 1\text{ A}$: $0.2\ \Omega/1\%$, $I_N = 2\text{ A}$: $0.1\ \Omega/1\%$ measuring shunt is integral with the device. Measurement by voltmeter terminal 33 - terminal 34 (200 mV = I_N)
Isolation of load circuit	2-pole by relay contacts - by manual release of RED button - approx. 20 ms after electronic tripping due to overload or short circuit ("OFF")

Technical Data ($T_U = 25\text{ °C}$, $U_B = \text{DC } 24\text{ V}$) ($T_U = \text{ambient temperature at } U_N$)

Control circuit

Control "In/Ctrl"	internal low-level signal relay in control input (with integral free-wheeling diode)
Control voltage U	"0" : 0...2.4 V "1" : 18...32 V
Control current I	typically 5...10 mA
Switching frequency f_{max}	10 Hz
Control signal (U_{Contr} "1")	"In/Ctrl" YELLOW LED lights with I_{Contr} flowing
Protection	reverse polarity protection (diode), overvoltage protection (varistor)

Fault indication

"Err1"	group fault signalisation potential-free relay contact N/O, (closed circuit principle) DC 30 V/5 mA...1 A relay contact "Err1" open
Fault indication "Err1"	- wire breakage in the load circuit - load current < 30 mA - other faults (ground fault in load circuit or internal fault) - overload/short circuit (= "Err2") - LED RED "Error" lighted - LED GREEN "O.K." not lighted - relay contact "Err1" closed
Signal delay "Err2"	typically 600 ms fault indication potential-free auxiliary contact, make contact N/O, DC 30 V/5 mA...1 A
Fault indication "Err2"	signal contact "Err2" closed - overload or short circuit in the load circuit - LED RED "Error" lighted - LED GREEN "O.K." not lighted - relay contact "Err1" open - auxiliary contact "Err2" closed - RED button "OFF" - reset required - 2-pole physical isolation in load circuit - manual release "OFF" - reverse polarity of U_S (LEDs not indicating)

Option -210

Function "BM"	with status indication "BM" potential-free relay contact DC 30 V / 5 mA...1 A relay contact closed, if $I_{\text{load}} > 30\text{ mA}$ relay contact open, with wire breakage and after trip of circuit breaker
Option -220	analogue output proportional to load current "ANA" 4-20 mA, max. load 500 Ω on $-U_S$ (term. 44) $U_{\text{Contr}} = \text{"0"} \rightarrow 4\text{ mA}$ $U_{\text{Contr}} = \text{"0"} \rightarrow 4\text{ mA with } 0\text{ A (load current)}$ 20 mA with I_N Accuracy: $\pm 5\%$ of measured value

General data

Ambient Temperature	0...+50 °C (without condensation)
Storage temperature	-20...+70 °C
Terminals	COMBICON MSTBO 2.5/4 1x2.5 mm ² max. 16-pole Some are double terminals -> loop-through possibility (continuous load max. 6 A)
Back-up protection for SSRPC	not required because of integral fail-safe element with VDE approval
Housing material	PA 66-FR
Mounting	symmetric rail to EN 50022-35
Vibration	3 g, to IEC 60068-2-6 test Fc
Degree of protection (IEC 529/DIN 40050)	IP20 housing IP20 terminals
EMC	emitted interference EN 50081-1 interference suppression EN 61000-6-2
Mounting dimensions	22.5 x 99 x 122 mm (w x h x d)
Mass	approx. 130 g

Ordering information

Type

E-1072	Solid State Remote Power Controller
Version	
210	with additional option: status indication
220	with additional option: analogue output 4-20 mA
Voltage rating of load	
DC 24 V	
Current rating	
1 A or 2 A	
E-1072 - 210 - DC 24 V - 1 A ordering example	

Status matrix

Operating status	fault-free operation		Short circuit / overload in load circuit	Wire break in load circuit		other faults
	"0"	"1"		"0"	"1"	
Control input	"0"	"1"	"1"	"0"	"1"	"0"
Load output	OFF 2-pole non-conductive	ON 2-pole conductive	OFF 2-pole non-conductive	OFF 2-pole non-conductive	ON 2-pole conductive	OFF 2-pole non-conductive
Load circuit isolated 2 pole (via relay contacts)	no	no	yes	no	no	no
Indication						
YELLOW LED "In/Ctrl"	0	1	1	0	1	0
GREEN LED "O.K."	1	1	0	0	0	0
RED LED "Error"	0	0	1	1	1	1
relay contacts "Err1" (group fault)	closed	closed	open	open	open	open
auxiliary contacts "Err2" (circuit breaker)	open	open	closed	open	open	open
RED operating/reset button	ON	ON	OFF "OFF"	ON	ON	ON
relays contact "BM" indication option-210	open	closed	open	open	open	open
analgo output option-220	4 mA	4 mA... 20 mA	> 20 mA, 4 mA	4 mA	4 mA	4 mA
Remark	available	$I_{\text{Load}} > 30\text{ mA}$ < 1 A (or 2 A)	RED button to be reset		$I_{\text{Load}} < 30\text{ mA}$	ground fault in load circuit or internal fault

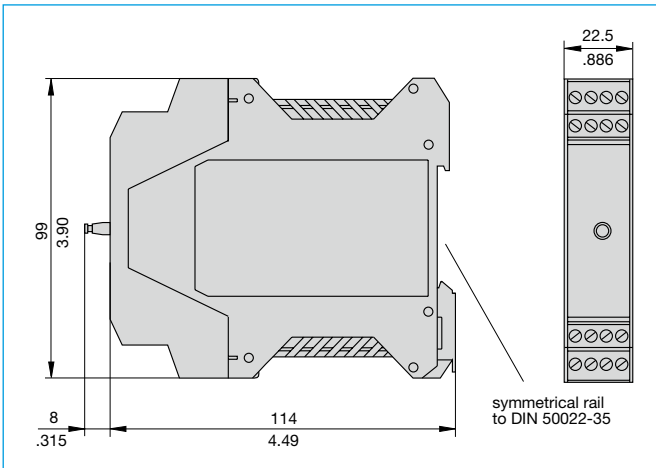
1 = LED lights
0 = LED does not light

Operating modes at:

- reverse polarity: indication of fault "Err2"; LEDs not illuminated!
- manual release "OFF" (RED button out): indication of fault "Err1" and "Err2", additionally lighted LED RED "Error".
- with $U_S = 0\text{ V}$: group fault signalisation »Err1« (closed circuit principle)

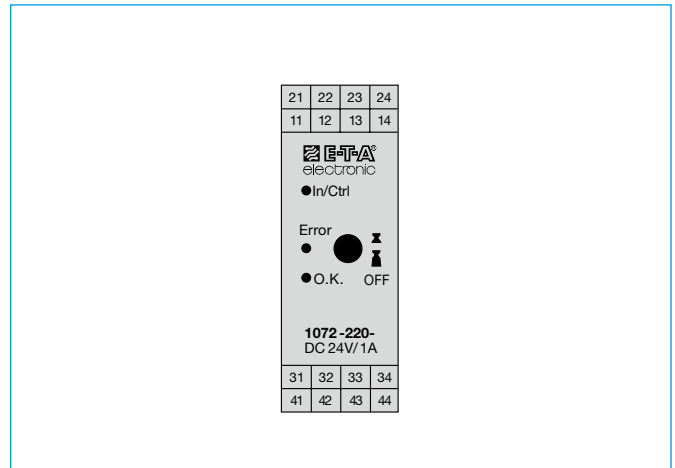
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Dimensions

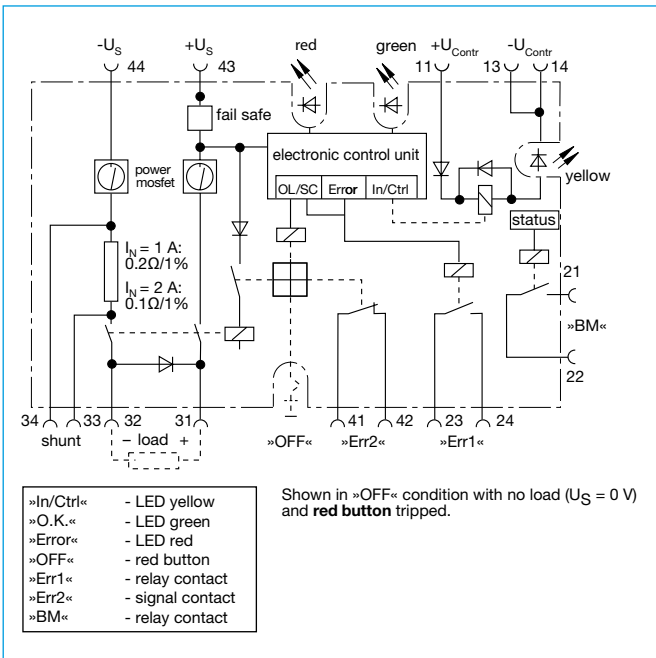


This is a metric design and millimeter dimensions take precedence ($\frac{\text{mm}}{\text{inch}}$)

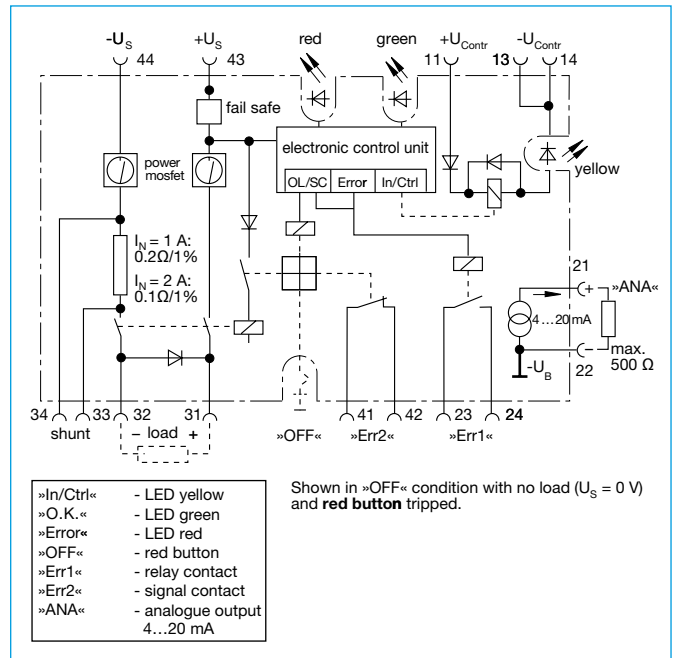
Connection diagram



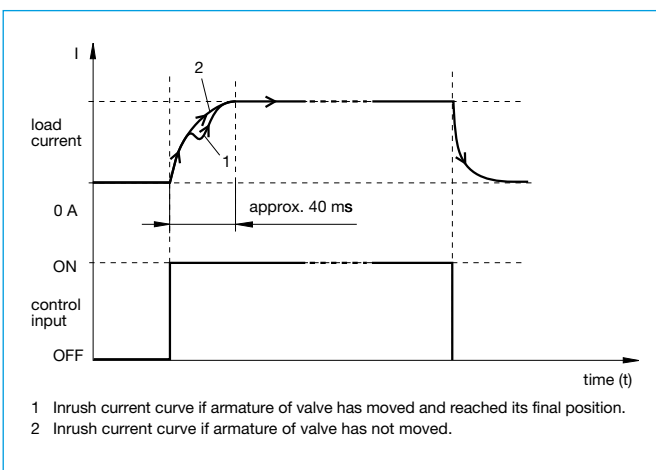
Basic circuit diagram -210



Basic circuit diagram -220



Inrush current curve magnetic valve



Terminal selection

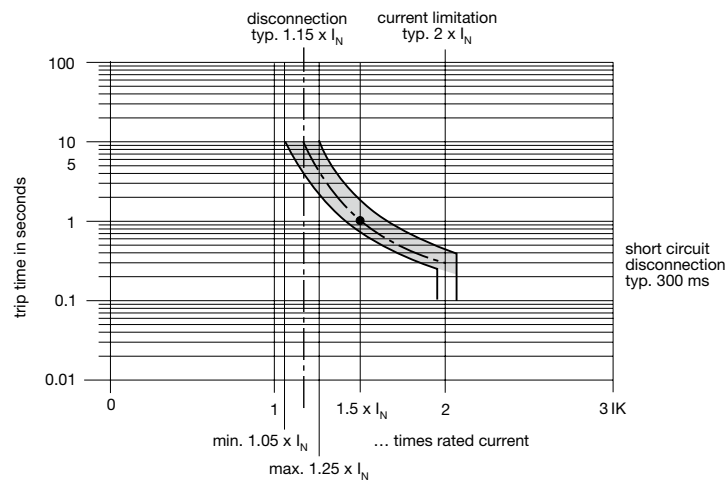
Level	Terminal	Remark
1	11	+U _{Contr} (Control voltage plus)
	12	not used
	13 / 14	-U _{Contr} (Control voltage minus)
DC 18...32 V		
2	21	option-210: Kl. 21 (+)
	22	status indication "BM" analog output (relay contact) 4-20 mA Kl. 22 (-)
	23 / 24	"Err1" group fault signalisation (relay contact)
DC 24 V / 1 A (or 2 A)		
3	31	load (+)
	32	load (-)
	33 / 34	load current measurement by voltmeter I _N = 1 A: shunt 0.2 Ω/1 % I _N = 2 A: shunt 0.1 Ω/1 % shunt integral with device Kl. 33: shunt+ / Kl. 34: shunt-
4	41 / 42	"Err2" indication of fault circuit breaker (auxiliary contact)
	43	+U _S (operating voltage plus)
	44	-U _S (operating voltage minus)
	DC 19.2...36 V	

Top side

21	22	23	24	LEVEL 2
11	12	13	14	LEVEL 1
31	32	33	34	LEVEL 3
41	42	43	44	LEVEL 4

Cable side (bottom)

Typical time/current characteristics (T_A = 25 °C)



All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.